# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicant: | JOO-SUN YOON, ET AL. | ) |
| | | ) Group Art Unit: 2871 |
| Serial No. | 10/612,649 | ) |
| | | ) Examiner: Duong, Thoi V. |
| Filed: | July 2, 2003 | ) |
| | | ) |
| For: | REFLECTIVE-TRANSMISSIVE TYPE LIQUID CRYSTAL DISPLAY DEVICE AND METHOD FOR FABRICATING THE SAME | ) Confirmation No.: 5474 |

---

## APPEAL BRIEF

---

1. THE REAL PARTY IN INTEREST

The real party in interest in this appeal is Samsung Electronics Co. Ltd. Ownership by Samsung Electronics Co. Ltd. is established by an assignment document recorded for this application on July 2, 2003 on Reel 014273 and Frame 0016.

2. RELATED APPEALS AND INTERFERENCES

Applicants are unaware of any related patent applications or patents under any appeal or interference proceeding.

3. STATUS OF CLAIMS

Claims 1-7 and 14-18 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Applicant's Admitted Prior Art, Figures 1-4 (hereinafter "APA") in view of Kubo et al., U.S. Patent No. 6,452,654 B2 (hereinafter "Kubo").

Claims 1-23 are pending are pending in the present application. Claims 8-13 and 19-23 are withdrawn from consideration, and Claims 1-7 and 14-18 are currently being appealed. Claim 24 is cancelled.

4. STATUS OF AMENDMENTS

There have been no amendments filed subsequent to receipt of the Final Office action of July 11, 2007.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1 is directed to an apparatus, and more specifically to a reflective-transmissive type liquid crystal display device. The apparatus includes a first substrate (200 in FIG. 5). The first substrate has a thin film transistor (220 in FIGS. 5-9) disposed on a first transparent substrate (210 in FIGS. 5-9), an organic insulation layer (230 in FIGS. 5, 7-9) disposed on the first transparent substrate to insulate the thin film transistor and having a contact hole (232 in FIGS. 7, 8) exposing an output terminal (229 in FIGS. 7 and 8 and page 12, lines 1-5) of the thin film transistor, a pixel electrode (240 in FIGS. 5, 7-10, 12 and 13), and an orientation film (250 in FIGS. 5, 9 and 11) coated on an upper surface of the pixel electrode (FIGS. 5, 9 and 11, and page 19, lines 7-9) and having an orientation groove (252 in FIGS. 9, 10, 12, 14 and 16). The pixel electrode has a transparent electrode (242 in FIGS. 5 and 8-16) connected to the output terminal of the thin film transistor through the contact hole disposed on the organic insulation layer, and a reflective electrode (244 of FIGS. 8-16) disposed on the transparent electrode and having an area less than the transparent electrode (FIGS. 10-16 and page 13, lines 19-23). See, page 10, lines 17-23, page 12, line 1 to page 14, line 22.

The reflective electrode defines a first region of the transparent electrode ("FIRST REGION" shown as hatched lines in FIGS. 10-16, page 13, line 25 to page 14, line 1 and page 17, lines 12 and 13), and a portion of the transparent electrode exposed without being covered by the reflective electrode defines a second region ("SECOND REGION" in FIGS. 10-16 and page 14, lines 2 and 3). The second region of the transparent electrode includes a first boundary (244a in FIGS. 10 and 11, 244c in FIGS. 12 and 13, 244d in FIGS. 14 and 15, and 244k in FIG. 16) and a second boundary (FIGS. 242a and 242b in FIG. 12). The first boundary is a boundary between the first and second regions (FIGS 10-16), and the second boundary is an exposed edge of the transparent electrode (For example, 242a and 242b in FIG. 12 and page 17, lines 8-12). The orientation groove is rubbed in a first direction ("RUBBING DIRECTION" shown with arrow(s)

in FIGS. 5, 9, 10, 14 and 16) from the first boundary toward the second boundary and prevents impurity from being stacked at the first boundary of the transparent electrode (page 14, lines 14-16). See, page 10, lines 17-23, page 12, line 1 to page 14, line 22.

The apparatus further includes a second substrate (400 in FIG. 5) having a color filter (420 in FIG. 5) disposed on a second transparent substrate (410 in FIG. 5) in opposition to the pixel electrode, and a common electrode (430 in FIG. 5) disposed on an upper surface of the color filter and facing the pixel electrode. See, page 22, lines 13-18.

The apparatus further includes a liquid crystal (300 in FIG. 5) is interposed between the first and second substrates. See, page 22, line 25 to page 23, line 2.

Independent Claim 14 is directed to a method, and more specifically to a method for fabricating a reflective-transmissive type liquid crystal display device. The method includes forming a thin film transistor (220 in FIG. 5-9) on a first transparent substrate (210 in FIGS. 5-9), depositing an organic insulation layer (230 in FIGS. 8 and 9) on the first transparent substrate to insulate the thin film transistor, the organic insulation layer having a contact hole (232 in FIGS. 7 and 8) exposing an output terminal (229 in FIGS. 7 and 8 and page 12, lines 1-5) of the thin film transistor, forming a pixel electrode (240 in FIGS. 8 and 9) on the organic insulation layer, the pixel electrode having a transparent electrode (242 in FIGS. 8 and 9) connected to the output terminal of the thin film transistor through the contact hole, and a reflective electrode (244 in FIGS. 8 and 9) formed on the transparent electrode, the reflective electrode having an area less than the transparent electrode (FIGS. 10-16 and page 13, lines 19-23) and defining a first region ("FIRST REGION" shown as hatched lines in FIGS. 10-16, page 13, line 25 to page 14, line 1 and page 17, lines 12 and 13) of the transparent electrode, a portion of the transparent electrode being exposed without covering by the reflective electrode defining a second region ("SECOND REGION" in FIGS. 10-16 and page 14, lines 2 and 3), the second region of the transparent electrode including a first boundary (244a in FIGS. 10 and 11, 244c in FIGS. 12 and 13, 244d in FIGS. 14 and 15, and 244k in FIG. 16) and a second boundary (FIGS. 242a and 242b in FIG. 12), the first boundary being a boundary between the first and second regions (FIGS 10-16) and the second boundary being an exposed edge of the transparent electrode (For example, 242a and 242b in FIG. 12 and page 17, lines 8-12), coating an orientation film (250 in FIG. 9) on an upper

surface of the pixel electrode (FIGS. 5, 9 and 11, and page 19, lines 7-9), rubbing the orientation film in a first direction ("RUBBING DIRECTION" shown with arrow(s) in FIGS. 5, 9, 10, 14 and 16) from the first boundary toward the second boundary to form an orientation groove (252 in FIGS. 9, 10, 12, 14 and 16) on the orientation film, the rubbing the orientation film in the first direction preventing impurity from being stacked at the first boundary of the transparent electrode (page 14, lines 14-16), forming a color filter (420 in FIG. 5) on a second transparent substrate (410 in FIG. 5) in opposition to the pixel electrode, forming a common electrode (430 in FIG. 5) on an upper surface of the color filter and facing the pixel electrode; and interposing a liquid crystal (300 in FIG. 5) between the common electrode and the pixel electrode on which the orientation film and the orientation groove are formed. See, page 10, lines 17-23, page 12, line 1 to page 14, line 22, page 22, lines 13-18 and page 22, line 25 to page 23, line 2.

## 6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner's rejection of Claims 1-7 and 14-18 under 35 U.S.C. § 103(a) as being unpatentable over APA in view of Kubo.

## 7. ARGUMENT

### A. THE EXAMINER'S REJECTION OF CLAIMS 1-7 and 14-18 UNDER 35 U.S.C. §103(a) IS IMPROPER

Applicants submit that the Examiner did not establish a prima facie case of obviousness for the rejection of Claims 1-7 and 14-18 under 35 U.S.C. §103(a) because the Examiner has not identified a proper motivation for the combination of APA and Kubo, and because APA and Kubo teach away from such a combination suggested by the Examiner. Applicants also note that APA in view of Kubo do not teach all of the elements of the claimed invention.

Regarding independent Claim 1, the Examiner alleges in the Final Office action of July 11, 2007 that APA discloses a reflective-transmissive type liquid crystal display device having:

a first substrate (Figure 1, element 11) including:

a thin film transistor (Figure 1, element 12) disposed on a first transparent substrate (Figure 1, element 11),

an organic insulation layer (Figure 1, element 13) disposed on the first transparent

substrate to insulate the thin film transistor, the organic insulation layer having a contact hole (Figure 1, element 13a) for exposing an output terminal (Figure 1, element 12d) of the thin film transistor (specification, page 3, lines 13-16),

a pixel electrode (Figures 1-4, element 14) including a transparent electrode (Figures 1-4, element 14a) connected to the output terminal of the thin film transistor through the contact hole disposed on the organic insulation layer (specification, page 3, lines 17-24), and a reflective electrode (Figures 1-4, element 14b) disposed on the transparent electrode, having an area less than the transparent electrode and defining a first region of the transparent electrode (Figures 1-4, element 14b named by the Examiner as "reflective display region"), a portion of the transparent electrode being exposed without being covered by the reflective electrode defining a second region (Figures 1-4, element 14c, named by the Examiner as "transmissive display region," citing specification, page 4, lines 4-10), the second region including a first boundary between the first and second regions 14b and 14c (Figures 2-4), and

an orientation film (Figure 1, element 15) coated on an upper surface of the pixel electrode and having an orientation groove rubbed in a first direction (Figures 2-4, element 15a) toward the second region (Figures 2-4, element 14c, and specification, page 4, lines 13-22);

a second substrate (Figure 1, element 21) including:

a color filter (Figure 1, element 22) disposed on a second transparent substrate (Figure 1, element 21) in opposition to the pixel electrode, and

a common electrode (Figure 1, element 23) disposed on an upper surface of the color filter and facing the pixel electrode; and

a liquid crystal layer (Figure 1, element 30) interposed between the first and second substrates.

(See, Pages 2 and 3 of the Final Office action dated July 11, 2007.)

Regarding independent Claim 14, the Examiner alleges in the Final Office action of July 11, 2007 that APA discloses a method for fabricating a reflective-transmissive type liquid crystal display device, the method comprising:

forming a thin film transistor (Figure 1, element 12) on a first transparent substrate (Figure 1, element 11),

depositing an organic insulation layer (Figure 1, element 13) on the first transparent substrate to insulate the thin film transistor, the organic insulation layer having a contact hole (Figure 1, element 13a) for exposing an output terminal (Figure 1, element 12d) of the thin film transistor (specification, page 3, lines 13-16),

forming a pixel electrode (Figures 1-4, element 14) on the organic insulation layer, the pixel electrode including a transparent electrode (Figures 1-4, element 14a) connected to the output terminal of the thin film transistor through the contact hole (specification, page 3, lines 17-24), and a reflective electrode (Figures 1-4, element 14b) disposed on the transparent electrode, having an area less than the transparent electrode and defining a first region of the transparent electrode (named by the Examiner as "reflective display region"), a portion of the transparent electrode being exposed without being covered by the reflective electrode defining a second region (Figures 1-4, element 14c, named by the Examiner as "transmissive display region," citing specification, page 4, lines 4-10), the second region including a first boundary between the first and second regions 14b and 14c (Figures 2-4),

coating an orientation film (Figure 1, element 15) on an upper surface of the pixel electrode,

rubbing the orientation film in a first direction (Figures 2-4, element 15a) toward the second region (Figures 2-4, element 14c) to form an orientation groove on the orientation film (specification, page 4, lines 13-22),

forming a color filter (Figure 1, element 22) n a second transparent substrate (Figure 1, element 21) in opposition to the pixel electrode,

forming a common electrode (Figure 1, element 23) on an upper surface of the color filter and facing the pixel electrode; and

interposing a liquid crystal layer (Figure 1, element 30) interposed between the common electrode and the pixel electrode on which the orientation film and the orientation groove are formed.

(See, Pages 3-5 of the Final Office action dated July 11, 2007.)

The Examiner alleges in the Final Office action of July 11, 2007 that APA discloses all of the proposed limitations except for the second region including a second boundary where the second boundary is an exposed edge of the second region. Kubo is relied upon as teaching a first region (Figure 4 of Kubo as annotated by the Examiner, element 22, named by the Examiner "reflective region"), a second region (Figure 4 of Kubo as annotated by the Examiner, element 20, named by the Examiner as "transmissive region"), a first boundary between first region 22 and second region 20, and a second boundary is an exposed edge of the transparent electrode (Figure 4 of Kubo, as annotated by the Examiner, element 21). (See, Page 5 of the Final Office action dated July 11, 2007.)

The Examiner concludes that therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify APA with the teaching of Kubo by forming a pixel electrode having a second region (transmissive region) including a first boundary and a second boundary, where the first boundary is a boundary between the first and second regions and the second boundary is an exposed edge of the transparent electrode in order to obtain a desired reflectance and transmittance (Col. 10, line 57 through Col. 11, line 5 of Kubo). (See, Page 5 of the Final Office action dated July 11, 2007.)

The Examiner also states that since APA and Kubo allegedly have the same structure with the instant invention, claimed properties or functions of Claims 1 and 14 are presumed to be inherent, and therefore concludes that it is obvious that the orientation groove rubbed in a first direction toward the second region including the first boundary and the second boundary also prevents impurity from being stacked at the first boundary of the transparent electrode. (See, Page 6 of the Final Office action dated July 11, 2007.)

In the Advisory Action of September 18, 2007 in reply to Applicants September 11, 2007 response to the Final Office action of July 11, 2007, the Examiner concedes that APA does not teach an orientation groove rubbed in a first direction (Figures 1-4, element 15a) from a first boundary to the second boundary being an exposed edge of the transparent electrode (Figures 1-4, element 14a). However, it is alleged that Kubo discloses a pixel structure with a second boundary being an exposed edge of the transparent electrode (Figure 4 of Kubo, as annotated by the Examiner, element 21) and describes an alignment film with a rubbing direction (orientation

groove) to provide a pretilt angle to liquid crystal molecules (Col. 15, lines 15-21 and Col. 26, lines 14-22 of Kubo).

The Examiner therefore concludes that APA's orientation groove rubbed from a first boundary to a second boundary which is not an exposed edge of the transparent electrode, in view of Kubo's exposed edge of the transparent electrode, suggests a structure of the claimed invention of an orientation groove rubbed in a first direction from a first boundary between first and second regions, towards a second boundary which is an exposed edge of the transparent electrode of Claims 1 and 14.

The Examiner further concludes that since the orientation groove of APA extends in a direction from the first region (reflective region) to the second region (transmissive region), the same orientation groove would apply to Figure 4 of Kubo. That is, the orientation groove would extend from the first boundary between transmissive region (Figure 4 of Kubo as annotated by the Examiner, element 20) and the reflection region (Figure 4 of Kubo as annotated by the Examiner, element 22) towards the second boundary which is an exposed edge of the transmissive region of Kubo.

APA teaches a reflective electrode 14b disposed on an upper surface of the transparent electrode 14a and having an opening window 14c disposed at a center of the reflective electrode 14b. (Figures 2-4 and specification, page 4, lines 4-10.) That is, since the opening window 14c is taught at a center of the reflective electrode 14b, there necessarily are *no exposed edges* of the transparent electrode 14 taught or suggested by APA. Therefore, APA provides no teaching or suggestion of <u>**an orientation groove rubbed** in a direction from the first boundary between the first and second regions **towards the second boundary being an exposed edge of the transparent electrode**, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode</u> of Claims 1 and 14. To the contrary, there are no exposed edges as taught by APA to even consider relative to the orientation groove 15a.

APA instead teaches the orientation groove 15a in a direction *towards* a boundary between the transparent electrode 14a and reflective electrode 14b (e.g., a "first boundary), such a direction being *opposite* to the claimed invention. (See, for example, regions A, B and C of Figures 2-4, respectively, of APA, and specification page 5, lines 21 and 22, page 6, lines 2-4 and

9-11.) In these regions A,B,C, at an inner part of the opening window 14c, the stacking of ions or impurities are *promoted* at a boundary between the transparent electrode 14a and the reflective electrode 14b because a step portion is disposed at the boundary of between the transparent electrode 14a and the reflective electrode. (specification, page 6, lines 15-25.) Therefore, since APA teaches opposite to the claimed invention regarding the orientation groove direction and the stacking of impurities, there exists no suggestion or motivation in APA nor to one of ordinary skill in the art to modify or combine APA to teach **an orientation groove rubbed in a direction from the first boundary between the first and second regions** towards the second boundary being an exposed edge of the transparent electrode, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode of Claims 1 and 14.

As discussed above as to how the teachings of APA are considered in the Advisory Action, the Examiner considers the orientation groove of APA extending in a direction from the first region (reflective region) to the second region (transmissive region). However, Applicants respectfully note that the direction of the orientation groove is claimed and disclosed in relation to the *first boundary* and the *second boundary* of the second region, not relative to the first and second *regions*. Particularly, Claims 1 and 14 recite, *inter alia* "an orientation groove rubbed in a direction from the first boundary between the first and second regions towards the second boundary being an exposed edge of the transparent electrode." Therefore, since the orientation groove's direction is claimed relative to the first and second boundary, it is submitted that in considering the teachings of APA, it is the orientation groove's direction relative to a first and second boundary (e.g., exposed edges of the transparent electrode 14a) that should be considered.

Therefore, since there necessarily are *no exposed edges* of the transparent electrode 14 taught or suggested by APA, and since APA instead teaches the orientation groove 15a in a direction *towards* a boundary between the transparent electrode 14a and reflective electrode 14b (e.g., a "first boundary) which is *opposite* to the claimed invention, there exists no teaching, suggestion or motivation in APA nor to one of ordinary skill in the art to modify or combine APA to teach **an orientation groove rubbed** in a direction from the first boundary between the first and second regions **towards the second boundary being an exposed edge of the transparent electrode**, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode of Claims 1 and 14.

As also noted above, Kubo is alleged to teach a rubbing direction (orientation groove) to provide a pretilt angle to liquid crystal molecules at Col. 15, lines 15-21 and Col. 26, lines 14-22. Here, Kubo merely discloses that the tilt angle of the tilted portions or the pitch of the concave/convex portions of the interlayer insulating film 49 (See, Figures 8B, 9, 10 and 11B of Kubo) should be sufficiently small to that alignment film can be formed and rubbed, and that vertical alignment films (not shown) are rubbed in a direction so as to provide a pretilt angle to liquid crystal molecules. That is, the alignment films and rubbing direction as taught by Kubo in the citations above, are merely taught relative to a pretilt angle of the liquid crystal molecules, and not considering how or where impurities may be collected or stacked, especially as a result of the direction of the rubbing relative to boundaries between reflection and transmission electrodes.

Applicants find no teaching or suggestion in Kubo as to any consideration or relationship between a rubbing direction and impurities, let alone a rubbing direction from a boundary between the transmission electrode region 20 and the reflection electrode region 22 towards an exposed edge of the transmission electrode region 20 to prevent the stacking of impurities, as claimed. Therefore, Kubo also does not teach or suggest **an orientation groove rubbed** in a direction from the first boundary between the first and second regions **towards the second boundary being an exposed edge of the transparent electrode**, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode of Claims 1 and 14, and does not remedy the deficiencies of APA.

Even considering that Kubo discloses an exposed edge of the transmission electrode region 20 (Figure 4 of Kubo), Kubo is silent as to a rubbing direction relative to this exposed edge. Therefore, there exists no suggestion or motivation in Kubo, nor to one of ordinary skill in the art to modify or combine Kubo to teach **an orientation groove rubbed** in a direction from the first boundary between the first and second regions **towards the second boundary being an exposed edge of the transparent electrode**, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode of Claims 1 and 14, and still does not remedy the deficiencies of APA.

In considering that the orientation groove 15a of APA is in a direction *towards* a boundary between the transparent electrode 14a and reflective electrode 14b (e.g., a "first boundary) as discussed above, if the orientation groove 15a of APA were applied to Kubo, the

resulting orientation groove would extend *towards* a boundary between the transmission electrode region 20 and the reflection electrode region 22 of Kubo, such as illustrated in Figure 4 of Kubo, which would stack impurities, and therefore be *opposite* to the claimed invention. That is, even the combination of APA and Kubo does not teach or suggest an orientation groove rubbed in a direction from the first boundary between the first and second **regions towards the second boundary being an exposed edge of the transparent electrode**, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode of Claims 1 and 14.

Furthermore, since the combination of APA and Kubo does not teach all of the limitations of the claimed invention, there exists no suggestion or motivation to modify or combine APA and Kubo to teach an orientation groove rubbed in a direction from the first boundary between the first and second **regions towards the second boundary being an exposed edge of the transparent electrode**, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode of Claims 1 and 14.

Because APA and Kubo, either alone or in combination, fail to teach each and every limitation of independent Claims 1 and 14, and since there exists no suggestion or motivation to modify or combine APA and Kubo to teach the claimed invention, Applicants respectfully submit that the rejection of Claims 1 and 14, and of Claims 2-7 and 15-18 as variously depending upon Claims 1 and 7, under 35 U.S.C. §103(a) is improper. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

## B. CONCLUSION

The Examiner has failed to make a prima facie showing of obviousness in rejecting Claims 1-7 and 14-18 under 35 U.S.C. §103(a). In particular, none of the references taken alone or in any permissible combination discloses an orientation groove rubbed in a first direction from the first boundary between the first and second regions, towards a second boundary being an exposed edge of the transparent electrode, as disclosed and claimed. Further, the Examiner has not provided a proper motivation to combine the references as proposed. For these reasons, it is respectfully submitted that the rejection under 35 U.S.C. §103(a) should be reversed.

Applicants hereby petition for any necessary extension of time required under 37 C.F.R. 1.136(a) or 1.136(b) which may be required for entry and consideration of the present Reply. Please charge any costs incurred in the filing of this Appeal Brief, along with any other associated costs, to Deposit Account No. 06-1130.

Respectfully Submitted,

CANTOR COLBURN LLP

By /Amy Bizon-Copp/

Amy Bizon-Copp
Registration No. 53,993
Cantor Colburn LLP
20 Church Street, 22nd floor
Hartford, CT 06103-3207
PTO Customer No. 23413
Telephone:(860) 286-2929
Fax: (860) 286-0115

Date: January 7, 2008

8. CLAIMS APPENDIX

1. A reflective-transmissive type liquid crystal display device, comprising:

a first substrate, including:

a thin film transistor disposed on a first transparent substrate;

an organic insulation layer disposed on the first transparent substrate to insulate the thin film transistor, the organic insulation layer having a contact hole for exposing an output terminal of the thin film transistor;

a pixel electrode including a transparent electrode connected to the output terminal of the thin film transistor through the contact hole disposed on the organic insulation layer, and a reflective electrode disposed on the transparent electrode, having an area less than the transparent electrode and defining a first region of the transparent electrode, a portion of the transparent electrode being exposed without being covered by the reflective electrode defining a second region, the second region of the transparent electrode including a first boundary and a second boundary, wherein the first boundary is a boundary between the first and second regions and the second boundary is an exposed edge of the transparent electrode; and

an orientation film coated on an upper surface of the pixel electrode and having an orientation groove rubbed in a first direction from the first boundary toward the second boundary, the orientation groove preventing impurity from being stacked at the first boundary of the transparent electrode;

a second substrate, including:

a color filter disposed on a second transparent substrate in opposition to the pixel electrode; and

a common electrode disposed on an upper surface of the color filter and facing the pixel electrode; and

a liquid crystal interposed between the first and second substrates.

2. The reflective-transmissive type liquid crystal display device as claimed in claim 1, wherein the first boundary includes at least two straight lines in a layout of the pixel electrode.

3. The reflective-transmissive type liquid crystal display device as claimed in claim 2, wherein the first direction is parallel to one of the straight lines.

4. The reflective-transmissive type liquid crystal display device as claimed in claim 2, wherein the reflective electrode includes a sidewall making contact with the first boundary , and the sidewall is inclined to prevent the impurity from being stacked at the first boundary.

5. The reflective-transmissive type liquid crystal display device as claimed in claim 1, wherein the second region exposes two edges of the first region of the transparent electrode, and the two edges are connected to each other.

6. The reflective-transmissive type liquid crystal display device as claimed in claim 5, wherein the reflective electrode includes a sidewall making contact with the first boundary , and the sidewall is inclined to prevent the impurity from being stacked at the first boundary.

7. The reflective-transmissive type liquid crystal display device as claimed in claim 5, wherein the first boundary and the first region each have an L-shaped configuration.

8. (Withdrawn) The reflective-transmissive type liquid crystal display device as claimed in claim 1, wherein the second region partially exposes one edge of the transparent electrode.

9. (Withdrawn) The reflective-transmissive type liquid crystal display device as claimed in claim 8, wherein the reflective electrode includes a sidewall making contact with the boundary of the first and second regions, and the sidewall is inclined to prevent the impurity from being stacked at the boundary.

10. (Withdrawn) The reflective-transmissive type liquid crystal display device as claimed in claim 8, wherein the boundary between the first and second regions, and the first region each include a U-shaped configuration.

11. (Withdrawn) The reflective-transmissive type liquid crystal display device as claimed in claim 1, wherein the second region is formed on an inside of the first region, and wherein the reflective electrode includes a sidewall adjacent to the boundary of the first and second regions, the sidewall being inclined to prevent the impurity from being stacked at the boundary.

12. (Withdrawn) The reflective-transmissive type liquid crystal display device as claimed in claim 11, wherein the transparent electrode includes a plurality of the second regions, and wherein the second regions include a circular shape or a rectangular shape.

13. (Withdrawn) The reflective-transmissive type liquid crystal display device as claimed in claim 11, wherein the color filter comprises a first tone at the first region corresponding to the reflective electrode and a second tone at the second region of the transparent electrode being exposed without being covered by the reflective electrode, which is different from the first tone.

14. A method for fabricating a reflective-transmissive type liquid crystal display device, the method comprising:

forming a thin film transistor on a first transparent substrate;

depositing an organic insulation layer on the first transparent substrate to insulate the thin film transistor, the organic insulation layer having a contact hole for exposing an output terminal of the thin film transistor;

forming a pixel electrode on the organic insulation layer, the pixel electrode including a transparent electrode connected to the output terminal of the thin film transistor through the contact hole and a reflective electrode formed on the transparent electrode, having an area less than the transparent electrode and defining a first region of the transparent electrode, a portion of the transparent electrode being exposed without covering by the reflective electrode defining a second region, the second region of the transparent electrode including a first boundary and a second boundary wherein the first boundary is a

boundary between the first and second regions and the second boundary is an exposed edge of the transparent electrode;

coating an orientation film on an upper surface of the pixel electrode;

rubbing the orientation film in a first direction from the first boundary toward the second boundary to form an orientation groove on the orientation film, rubbing the orientation film in the first direction preventing impurity from being stacked at the first boundary of the transparent electrode;

forming a color filter on a second transparent substrate in opposition to the pixel electrode;

forming a common electrode on an upper surface of the color filter, the common electrode facing the pixel electrode; and

interposing a liquid crystal between the common electrode and the pixel electrode on which the orientation film and the orientation groove are formed.

15. The method as claimed in claim 14, wherein forming a pixel electrode comprises:

forming the transparent electrode on the first transparent substrate on which the thin film transistor and the organic insulation layer are formed;

forming a metal thin film on an upper surface of the transparent electrode; and

patterning the metal thin film such that the reflective electrode is formed on the first region of the transparent electrode and the first boundary has a linear shape in a layout of the pixel electrode.

16. The method as claimed in claim 15, wherein patterning the metal thin film includes

forming a sidewall of the reflective electrode at the first region adjacent to the first boundary, the sidewall slanting to prevent the impurity from being stacked at the sidewall of the reflective electrode.

17. The method as claimed in claim 14, wherein forming a pixel electrode comprises:

forming the transparent electrode on the first transparent substrate on which the thin film transistor and the organic insulation layer are formed;

forming a metal thin film on an upper surface of the transparent electrode; and

patterning the metal thin film such that the reflective electrode is formed on the first region of the transparent electrode and the second region exposes two edges of the transparent electrode, the two edges being connected to each other.

18. The method as claimed in claim 17, wherein patterning the metal thin film includes forming a sidewall of the reflective electrode at the first region adjacent to the first boundary, the sidewall slanting so as to prevent the impurity from being stacked at the sidewall of the reflective electrode.

19. (Withdrawn) The method as claimed in claim 14, wherein forming a pixel electrode comprises:

forming the transparent electrode on the first transparent substrate on which the thin film transistor and the organic insulation layer are formed;

forming a metal thin film on an upper surface of the transparent electrode; and

patterning the metal thin film such that the reflective electrode is formed on the first

region of the transparent electrode and the second region exposes one edge of the transparent electrode.

20. (Withdrawn) The method as claimed in claim 19, wherein patterning the metal thin film includes forming a sidewall of the reflective electrode at the first region adjacent to the boundary, the sidewall slanting so as to prevent the impurity from being stacked at the sidewall of the reflective electrode.

21. (Withdrawn) The method as claimed in claim 14, wherein forming a pixel electrode comprises:

forming the transparent electrode on the first transparent substrate such that the second region is formed on an inside of the first region;

forming a metal thin film on an upper surface of the transparent electrode; and

patterning the metal thin film such that the reflective electrode is formed on the first region of the transparent electrode, and a sidewall of the reflective electrode is slantingly formed at the first region adjacent to the boundary so as to prevent the impurity from being stacked at the sidewall of the reflective electrode.

22. (Withdrawn) The method as claimed in claim 21, wherein the transparent electrode includes a plurality of the second regions.

23. (Withdrawn) The method as claimed in claim 21, wherein the second regions include a circular shape or a rectangular shape.

24. (Canceled)

9. <u>EVIDENCE APPENDIX</u>

Attached hereto are:

- U.S. Patent No. 6,452,654

10. <u>RELATED PROCEEDINGS APPENDIX</u>

Applicants are not aware of any related proceedings for this patent application.